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CONCRETE WORKER'S REFERENCE BOOKS

Concrete Monuments Mausoleums and Burial Vaults

By A. A. HOUGHTON

Author of "Concrete from Sand Molds," "Ornamental
Concrete Without Molds," Etc.



Being Number 6 of this Series

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CONCRETE MONUMENTS

Mausoleums and Burial Vaults

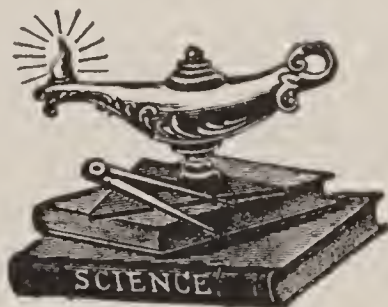
A PRACTICAL TREATISE

EXPLANATORY OF THE MOLDING OF VARIOUS TYPES OF CONCRETE MONUMENTS, WITH THE CONSTRUCTION OF MOLDS FOR SAME. LETTERING AND ORNAMENTAL EFFECTS WITH SIMPLE METHODS OF SECURING THE DESIRED RESULTS ARE FULLY TREATED. PLANS AND DESIGNS FOR MAUSOLEUMS AND BURIAL VAULTS ARE GIVEN WITH COMPLETE DETAILS OF CONSTRUCTION

By

A. A. HOUGHTON

Author of "Concrete From Sand Molds," "Ornamental Concrete Without Molds," etc., etc.



Fully Illustrated

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P R E F A C E

The molding of concrete monuments is a very profitable industry, as this is a field in which large profits are secured. The concrete worker by being able to produce his work at a far less cost and also without long delays, waiting for the stone to be finished at the quarry, has a great advantage over the competition of the natural stone dealer.

A careful study of the designs and methods explained in this volume, will show the reader that concrete may be made as beautiful as natural stone. By employing perfectly molded panels of smooth, glossy concrete that reflect the light like polished natural stone, and these placed in a die or block of a contrasting color of concrete, gives results that is of exceptional richness and beauty.

If the aggregate is well selected the colors will not fade or grow lighter. This is an advantage over natural stone, as the blue vein marble grows lighter as it is exposed to the elements, which has caused a vast amount of dissatisfaction among purchasers.

The inlaid concrete letter is of invaluable use, as this cannot be successfully produced except in concrete; by insuring that the inscription will always be easily read you will be making a strong

PREFACE

bid for a successful sale of your product. The other methods of lettering concrete or engraving the inscriptions will also be of value, as it will be found that if the concrete is carefully and evenly proportioned, as to aggregate, the engraving of same is as simple as upon natural stone.

The designs of mausoleums shown, with plans for the construction, will be of use and value, for the concrete worker is often required to erect work of this character. Concrete is an ideal material for this purpose when well water-proofed. The columbarium or the small private mausoleum, as it may be adapted for, will be one that can be erected upon any lot at a moderate cost, but little in excess of the average price of a natural stone monument, hence this should be extremely popular.

The simple molds for burial vaults, shown in this volume, should meet with the approval of the worker who desires to employ this as a side issue, as the cost of molds is very slight and the product secured will compare favorably with any produced in the expensive metal molds.

A. A. HOUGHTON.

March, 1911.

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FOREWORD

IT is the purpose of the writer to present in this series of books a complete explanation of various successful methods of concrete construction that may be employed by the beginner as well as by the more experienced worker. I shall endeavor to give the details of molds and ideas that are not covered by patents, such as may be easily and cheaply constructed; hence the reader is not compelled to purchase expensive patented molds before putting into practise the many successful types of concrete construction I have exhaustively described in this series. There is no practical value to the reader in explaining a patented system of construction, other than a few words on its merits, as the owners of same are always pleased to give this information; hence in going outside the beaten track of concrete authors and presenting ideas, systems, and molds that are practical, successful in operation, and, above all, easily and simply constructed, I trust that I have merited the sincere gratitude of all fellow workers in the concrete field who seek such information.

Yours very truly,

A. A. HOUGHTON.

CONCRETE MONUMENTS, MAUSOLEUMS AND BURIAL VAULTS

The molding of concrete monuments, burial vaults and mausoleums gives the concrete worker a large profit, as it is entering into a field that has always commanded high prices; hence the competition of natural stone dealers may be met by prices that they cannot equal and yet leave the worker a handsome profit on the investment.

While there is a class who demand an article for the monetary cost of same; taking price as the most positive standard of quality. To the few who believe that an article cannot be successful or with beauty, unless it is expensive, concrete as a material for monuments, mausoleums, etc., will not appeal. As careful attention in molding will bring out the most beautiful and artistic effects in the concrete casts, the majority of the people may be converted to the use of this material as memorials for their departed friends.

Concrete properly molded can be fully the equal of cut stone, from an artistic standpoint; not as a cheap imitation of natural stone, but for the material it is of itself. In the average design the lines should be well defined and cleanly molded, as

the limited size of the work would render any other treatment unattractive to the majority of buyers. The concrete worker must consider the viewpoint of the buyer, and produce the class of work that would meet the most popular sale.

CONSTRUCTION OF THE MOLDS

Wood, glue, plaster and sheet metal is the usual material for the molds for concrete monuments, as but few metal molds are on the market for this purpose, and these are dependent upon the unit or block system of erecting the work.

The concrete worker has in wood a material that is easily worked, and with the various stock mouldings he has a very easy method of securing exceptionally beautiful ornamental effects. The designs shown in this book may all be produced with wood and sheet metal molds, with the exception of panels and such face plates that demand a glue or plaster mold.

The best manner of joining the corners of a wood mold is shown in Fig. 1, at (a), the outside boards must meet in a square butt-joint or a square miter-joint, and are held rigid with a strip of strap iron bent at right angles and with two or more holes drilled in the strap iron, into which are placed screw-eyes. The method of employing the screw-eyes instead of ordinary screws permits the molds to be assembled and removed from the work with

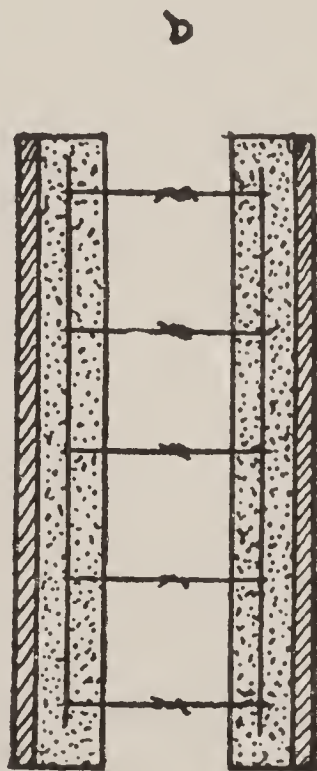
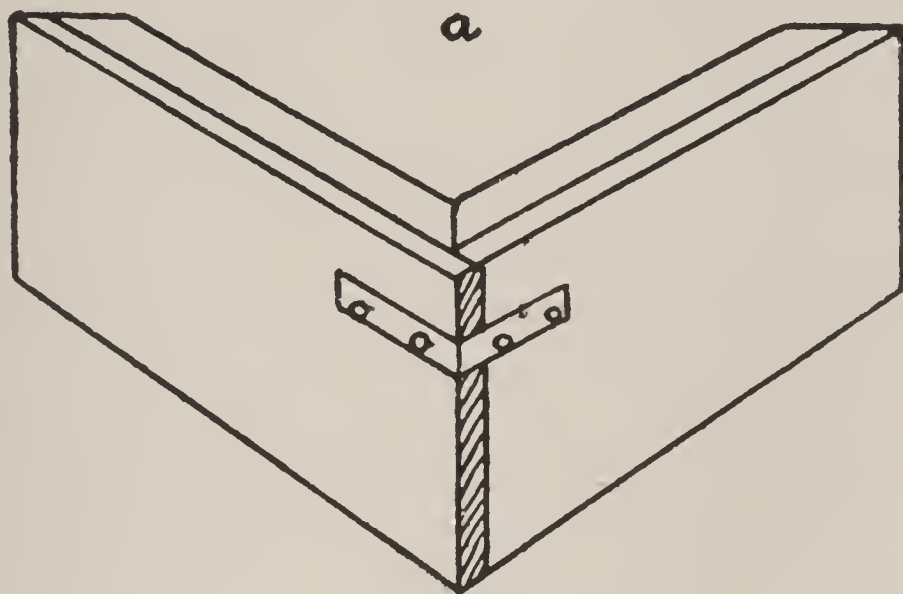


FIG. 1.—Fastening corners of molds and employing the panel system of molding.

greater rapidity, as well as insuring the rigidity of the centering at all times. With two of these angle irons at each joint of the outside boards, the mold must be held rigid and square when the screw-eyes are in place.

The bevels, mouldings, etc., are attached to each one of the outside boards, to give the inside molding surface the outline your design demands. These mouldings, strips, etc., are cut with a miter joint and each piece is nailed only to the outside boards, and not at the miter-joints, as the action of drawing the sections of molds together, with the angle irons or clamps as may be used, will bring the joints of the mouldings as tight as may be wished. This simplifies the removal of the molds, as the joints are placed at each corner, hence the molds must draw perfectly from the completed cast.

The manner of making the joints is also shown at (a) Fig. 1. An outside board or plank form must be employed for each section of mold, even when this is covered, upon the inside, with mouldings, bevel strips or other materials to form the outline. This makes it positive that the strips used for ornamental effect cannot warp and spring from the line desired, when the concrete is poured or tamped against same.

The form of the upper and lower bases of all monuments demand that they be molded bottom

upward, as the bevel is always upon the top of the base when it is set in position; also the bottom of base is covered by setting upon the foundation, or the base below same, hence a trowel finish on the bottom cannot be seen.

The construction of the base molds for monuments enables the worker to place the mouldings, bevel strips, etc., in the bottom of mold, and also permits the use of a facing material of better grade than is used for the center of the cast.

Many of the dies and caps may also be molded in this manner, and also in one piece, when the design will permit; this must be judged largely by the design of the work, and the chances of drawing perfectly from the cast. Where the die and cap is of a simple and plain design it is far more satisfactory when molded as one piece; but where there are many angles to the cap it should be cast in a separate mold, assembling or setting up the completed monument in the same manner as employed for those in natural stone.

THE PANEL SYSTEM OF MOLDING

At (b) Fig. 1 is shown the method of using panels to perfect many designs of ornamental work. These panels are perfected by molding upon glass slabs, using the facing mixture for the panel; into the center of the panel wire lath or expanded metal lath is imbedded at nearly the cen-

ter of the panel; from this tie wires project beyond the surface of the concrete to make a reinforcing material or bond between the panel and the main body of the concrete.

This permits the panels to be molded in colors or by using marble and granite aggregates produce a color to the panel that is in contrast to the main portion of the work. This is a valuable aid in securing ornamental effects to the plain surface of the concrete monument.

The panels are assembled or used by placing them inside the molds at the proper point, as shown at (b) Fig. 1; the wires are then twisted together, securely anchoring the panels into the main body of cast, in addition to the bond of the concrete.

As the face of the panel is cast upon a glass slab, it can be made very smooth and glossy, closely resembling polished stone; the opposite side to face can be treated by scrubbing with a stiff brush and water, when 12 hours old, which will expose the particles of aggregate. Thus when the panel is molded with the main body of the concrete, the bond is far stronger.

EMPLOYING PANELS FOR ORNAMENTAL EFFECTS

The illustration at Fig. 2 shows the possibilities of this system of molding ornamental concrete. The panel for the ivy leaf design is molded of

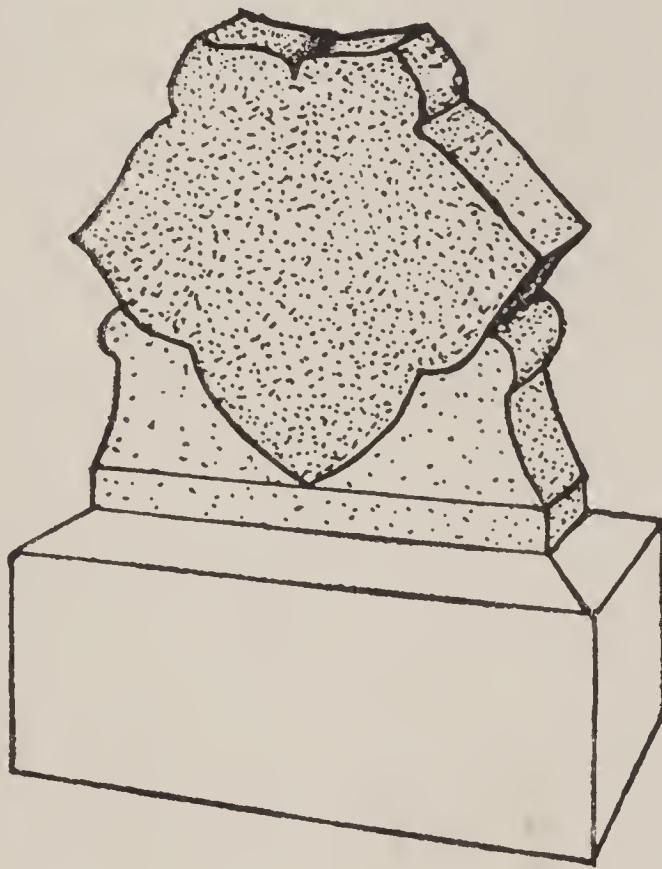


FIG. 2.—Showing effect of a die molded in two colors of concrete.

crushed granite, by using forms of wood, cut into an outline of the desired shape of panel. These are placed upon a sheet or slab of glass, when a front and back panel is to be used, or placed between two sheets of glass when the panel or slab of concrete is less than 5 inches in thickness. The concrete is then poured, thus molding the concrete into the exact outline of the cut-out form, with a smooth, glossy surface upon both front and back.

This panel is now mounted upon the remainder of die or slab, using another color of concrete mixture for the balance of the design. This insures clean, sharp lines of opposite and contrasting colors of concrete; hence the ornamentation is permanent and beautiful, as the panel is usually cast with a smooth and glossy surface, with the remainder of the cast in rough surface finish, or to imitate tooled stone.

This permits a wide range of ornamental effects, as the panels may be employed in the center of the die, surrounded by concrete of a contrasting color and finish, or to make an ornamental outline, as illustrated in Fig. 2.

In constructing the molds for panels, those of square outline are easily made up of strips of lumber fastened together so to perfect the design; these are placed between the two sheets of glass that make the front and back of mold, with a gate or opening in the top of the wood form for placing

the concrete. This molds a smooth surface upon each side of the panel.

Where the panel demands an outline that cannot be made up of straight strips, the design must be drafted upon blocks of wood and sawed out, as shown for the outline mold of a cross in Fig. 3. The joints of this mold are so arranged that the sections will draw perfectly from the cast. The desired thickness to the cast is made by placing the cut-out blocks upon each other until the required thickness is secured. This is a most simple method and one that insures success; the rough surface that would result from the sawed edges of sections is avoided by lining the molded surface of the wood with tin strips, bent to conform to each line in the molding surface. When this is not desirable, the edges of the blocks may be smoothed with sandpaper and then given several coats of shellac, or one coat of shellac and over this a good, smoothly laid coat of enamel, which if renewed as needed will mold as perfectly as a metal mold.

Where the panels are to be inserted in a large die, the best practice is to mold them about 2 inches thick, placing the wire or expanded metal lath 1 inch in depth from each surface.

The cross shown in Fig. 3 may be employed as a cap to many styles of monuments by molding in the form made up of cut-out blocks, then placing

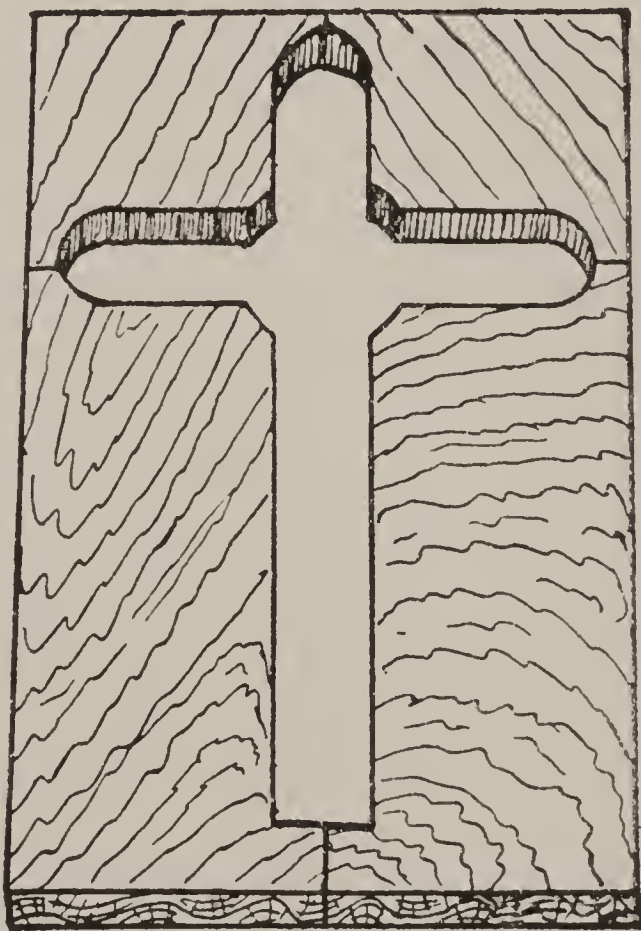


FIG. 3.—Wood forms or blocks cut in outline of the panel.

in the center of a base form and tamping the concrete for the base around the bottom of the cross, thus holding the cross vertical in the center of a base that is placed upon a suitable die. This style of cap is often seen on many monuments, and every concrete monumental worker should secure several designs of this style of symbolical ornamentation.

ORNAMENTING THE DIE WITH INCRUSTATION AND BAS-RELIEF DESIGNS

The concrete worker has at his command a wide range of ornamentation for the improvement of his work, as the ornamental design may be molded in relief upon the face of the work or inlaid in a contrasting color, as may be desired.

The illustration at Fig. 4 gives a slight idea of the invaluable aid that this method gives to the concrete worker, permitting the most elaborate ornamental effects to be easily and simply secured.

The inlaid ornament merely requires that the ornament be molded as a separate unit and then placed upon the glass slab or bottom of mold, at the point it is to be placed, the pouring of the concrete around same will bond strongly enough with the ornament to hold it firmly in position.

The molding of any ornamental figures in either bas-relief or indentation is as simply accomplished, by cutting an outline of the ornament from heavy cardboard and then pasting this upon the glass

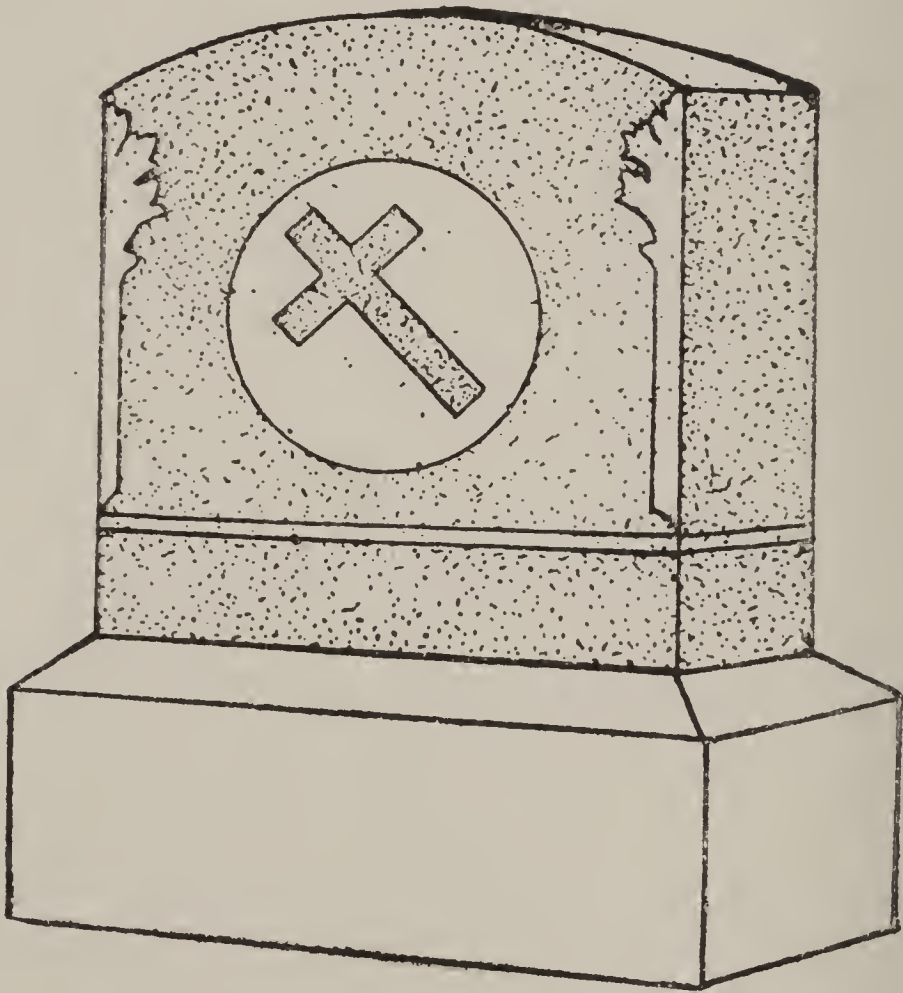


FIG. 4.—Ornamenting the surface of panels and dies.

plate with ordinary library paste, or upon the wood molding surface with thin glue, when wood is employed as the material for mold. This imprints the outline, or form of the cut-out design, into the concrete molded upon same, with the advantage that the cardboard will mold a rough surface to the concrete, while that portion of the concrete molded upon the glass slab will be smooth and glossy, thus bringing the ornamentation out more strongly. This is increased by inlaying the ornamented surface with a brush coat of a contrasting color, producing the effect shown in Fig. 4.

Where the cardboard is cut with the center of same in outline of any ornamentation the design is molded in bas-relief upon the face of the panel, surrounded by a contrasting surface or color, as shown by the cross inside the circle in Fig. 4.

This is adaptable to thousands of designs, thus enabling the worker to produce any tracery or design upon the molded face of the work that is simple enough to be cut in outline from cardboard. The cardboard may also be covered upon the molding surface with shellac, then upon this sand is dusted to make a rough molding surface; this is coated with shellac to prevent sticking, and the design is ready for use. This method produces a number of points and indentations upon the surface of the ornamentation, thus giving a very close imitation of tool dressed stone, and when properly

done the effect of a tool cut ornament is accurately secured.

Another method of securing the central ornament upon the die, as in Fig. 4, in two colors, is to mold the cross as a separate unit and then erect a circle around same upon the molding surface, the second color of mortar is then poured inside this circle around the cross, then the form for circle is removed and the main body of the panel or die is molded. This gives two or more colors to the completed surface, bringing out the design in permanent and clear outlines.

DETAILS OF THE DESIGNS ILLUSTRATED

As an aid in the molding also in the construction of forms I will give the proportional measurements of the various designs of monuments illustrated.

The style of monument shown at Fig. 2 may be made in two sizes. The smaller size would have a base 8" x 8" x 18", with the slab or tablet 14" x 14" and 4" thick, thus making the total height 22", and the weight, when molded in concrete, about 160 lbs. A larger size may be molded with a base 8" x 8" x 20", and the slab 18" x 16" and 4" thick, thus securing a total height of 26", and a weight of about 235 lbs. when molded in concrete. This style of monument is best when made in these sizes, as the design does not permit a larger size without losing its attractiveness, although the

panel has been used with excellent effect as an in-laid ornament in many large dies.

The style shown in Fig. 4 may also be molded in two sizes. In the smaller size the base is 1' 8" x 3' 4" and 16" high, including the bevel on top, which is 1½" in height, thus making the height of base at outside edge 14½". The die is 2' 8" high, 2' 8" long and 12" thick, the top is oval, which is easily secured by using a concave sheet iron form inside the mold for the die. Weight in concrete about 2,650 lbs. Total height, 48" from ground.

This can be made in a larger size with a total height of 50" and with the base 3' 6" long, 22" wide and 16" high over all, the height of bevel being 1½" as for the smaller size. The die is 34" long, 14" thick or wide and 34" in height. The weight of monument is about 3,000 lbs. when molded in concrete. This is a very attractive design, when ornamented as shown in Fig. 4, as the plain simple lines of the design permit successful molding.

The design shown at Fig. 5 may also be molded in two sizes and when produced with clean and sharply molded lines is an exceptionally beautiful piece of work. The height of the smaller size may be 58" over all, with the base 3' 6" long, 22" wide and 16" high, with the bevel 2" in height, thus making the base 14" in height at the outside edge. The die is made 34" long, 14" thick and 30" in

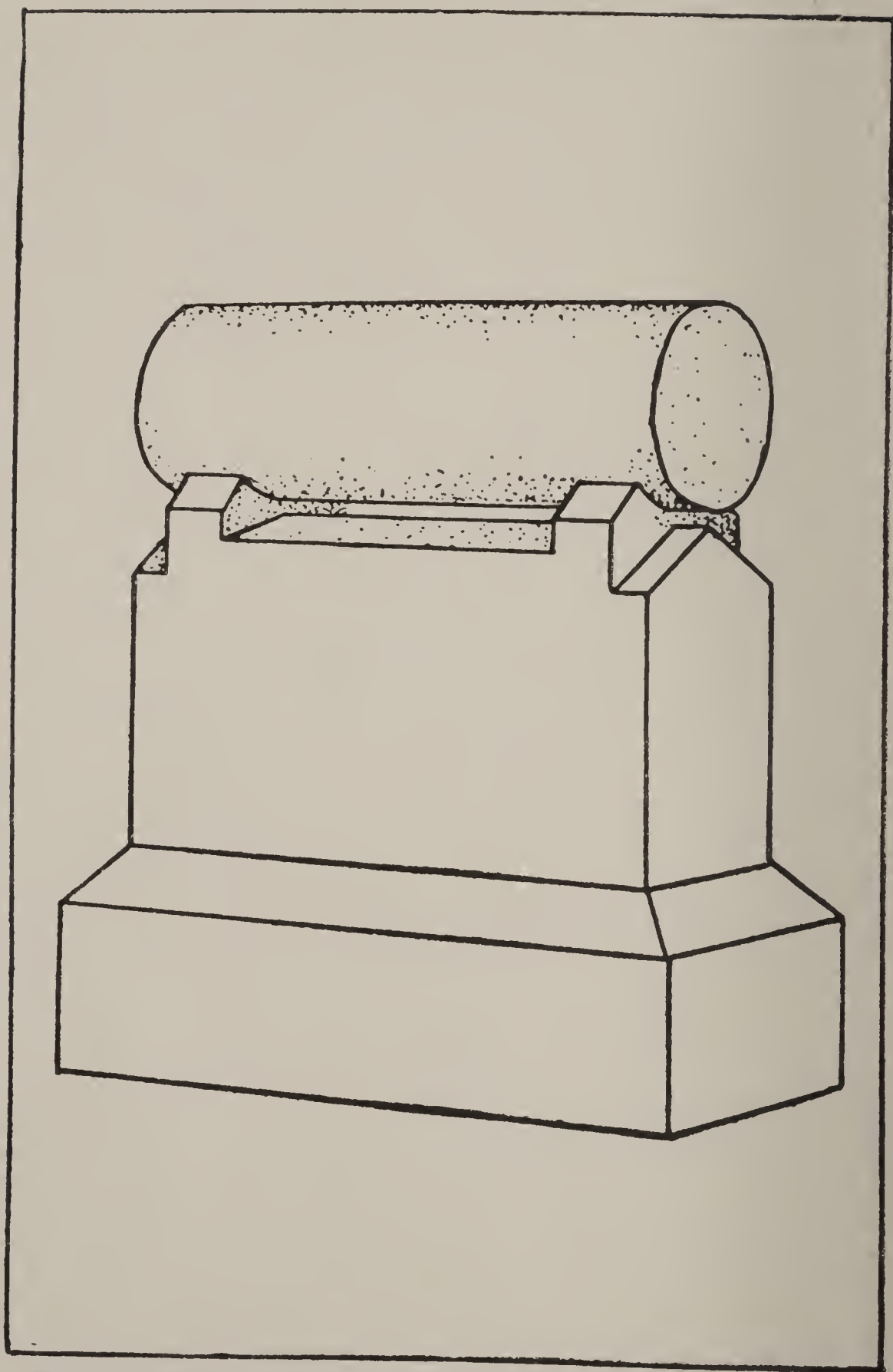


FIG. 5.—Design for concrete monument with roll or cap.

height. The cap or roll that is placed upon the die is 14" in diameter and 34" long. This is very simply molded in a circular mold made of sheet iron, arranging the mold so that the lap of the sheet iron, which will leave a slight mark on the cap or roll, will be at the point that is placed downward, hence is not noticeable. This slight mold mark may also be removed by rubbing with a carborundum stone when the work is cured. The inside or molding surface of the sheet iron mold is coated with enamel, so to produce a smooth surface upon the work; in the bottom of this mold and also at the top a ring is placed at the edge or end of mold, this molds a circular projection upon each end of the roll that is 1" smaller than the diameter of the roll and $\frac{3}{4}$ " in projection. This ring is cut from wood and is in sections, so it will not interfere with the operation of the mold. When this roll has permanently hardened, the projection may be broken with a chisel, to make a most excellent rock face panel at each end of the cap or roll. This makes a far better effect than when the cap or roll is molded with plain ends, as shown in Fig. 5. The top of this design is molded to give a circular notch or resting place for the cap or roll, which is easily arranged by placing blocks of wood of the desired shape in the bottom of mold, to make a reverse or mold of the design illustrated. The front and back panels of the die can be orna-

mented by inlaid ornaments with excellent results. The weight of this size, when molded in concrete, is about 3,650 lbs.

The design shown in Fig. 5 may also be molded in a larger size with a total height of 5' 2", and a total weight in concrete of about 4,200 lbs. The base is molded 3' 8" long, 24" wide and 16" high, with the bevel 2" in height, thus making the base 14" high at the outside corners. The die is 36" long, 16" thick and 32" high, with the cap or roll 36" long and 14" in diameter, thus making a massive design that will be exceptionally popular, for the reason that to produce in cut stone would be far greater in cost than when molded in concrete.

The design shown at Fig. 6 is one that is exceptionally pleasing, while simple enough in outline to be easily molded. The smallest size is 47" in height, and weighs about 2,200 lbs. The base is 38" long, 20" wide and 15" high, with a 2" bevel, making the outside corners of base 13" in height. The die is 30" long, 12" thick and 32" in height, with the beveled top 6" high, thus making the total height, at corners of die, but 26"; the bevel top, with the projecting rolls at side, are easily molded by wood blocks in the bottom of mold; in the center of these, upon each side of die, a concave opening is cut to mold the roll in the center of the beveled top. The projecting rolls at sides of die are 2" in projection and are made by cutting

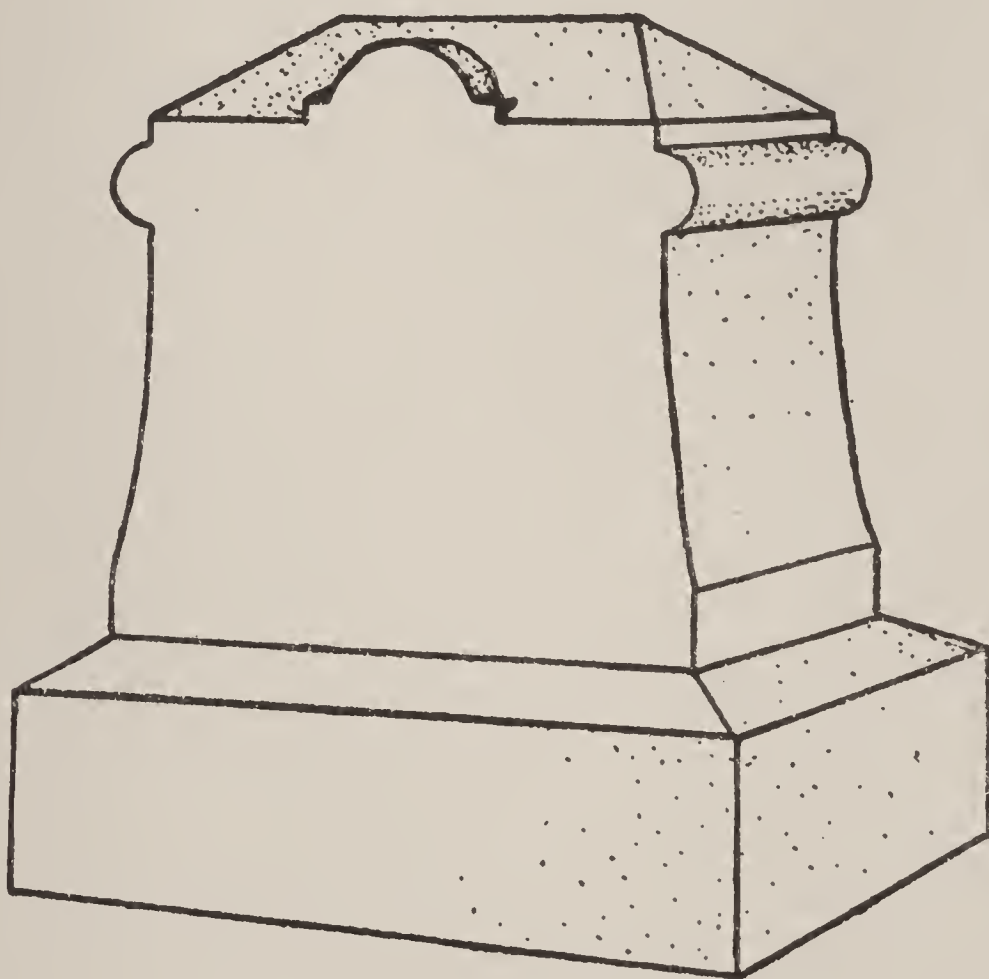


FIG. 6.—Design for concrete monument.

an outline of the side of die from a wood strip and then lining this with sheet iron, bent into this form; this is placed inside the mold, for die, at the proper point and thus molds the die in the form illustrated. The side below the projecting roll may be ornamented with a rock-faced panel, if so desired.

A larger size can also be molded with the total height 50", and a total weight, when molded in concrete, of about 2,950 lbs. The base mold is made 40" long, 22" wide and 16" in height, with a 2" bevel. The die is 32" long, 14" thick and 34" high, with the bevel at the top 6" in height, as upon the smaller design. This makes an exceptionally attractive monument when molded in granite concrete, as well as a design that will command a good price from the buying public.

The design of monument shown at Fig. 7 is very pleasing when molded in either marble concrete or granite concrete. This may be molded in two sizes. The smaller size is 5' 9" in height, and weighs about 950 lbs. The lower base is 20" x 20" and 10", with a 1" bevel at top, making the outside corners 9" high. The center base is 16" x 16" and 6" high, with a 1" bevel at the top. The upper base is 12" x 12" and 4" high, with a $\frac{3}{4}$ " bevel at top. The shaft or die is 10" x 10" and 32" in height. This is simply a square block, as the base for the cross or cap sets upon this at the

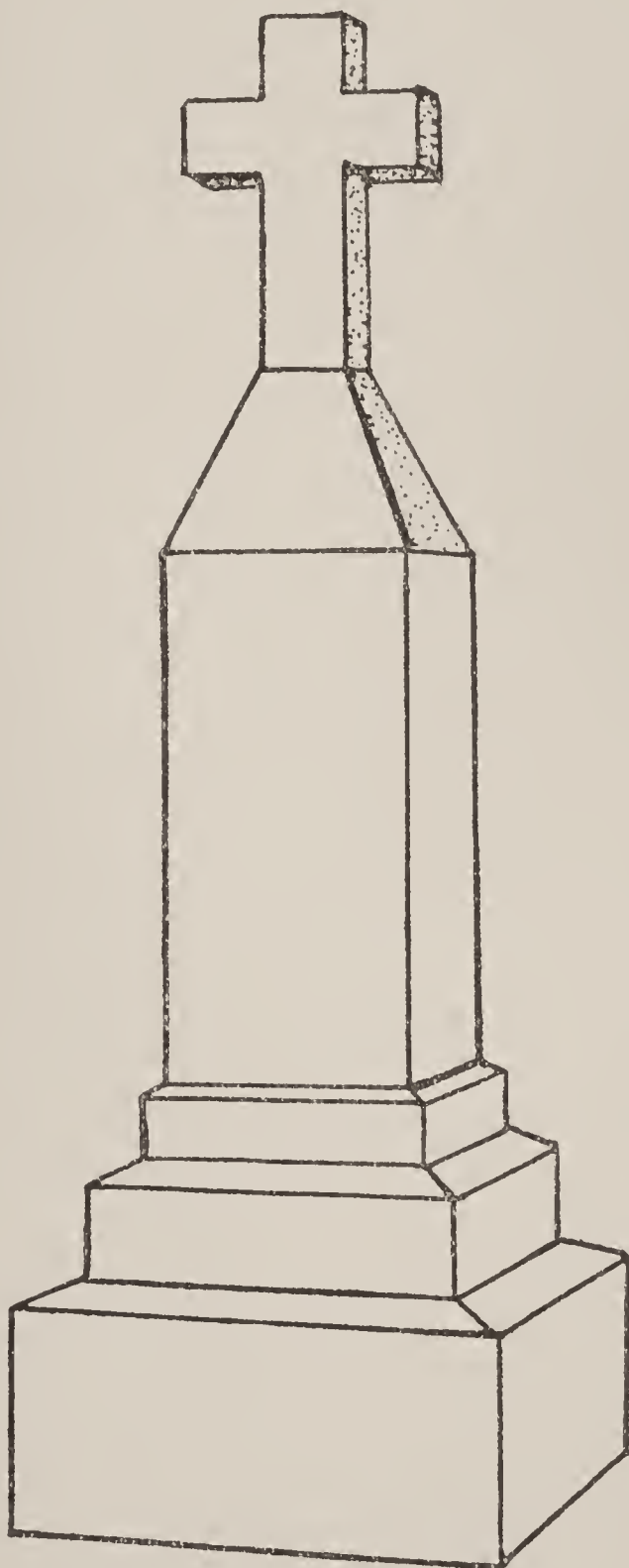


FIG. 7.—Design for monument, with cross.

bottom of bevel. The cross is 15" high, including base, 3" thick and 10" wide on the arms. The bevel to base of cross is 4" in height and 10" x 10" at bottom and 3" x 3" at top, or where the vertical portion of cross joins the base; this gives the vertical part of cross a height of 11" above the top of the base for same. The cross is molded in the manner shown in Fig. 3, and then placed in the center of the mold for base and the concrete for base tamped around same, thus demanding that the cross be molded 14" or 15" in height so to set far enough into the base to insure a good bond. If desired the cross may be joined to its base by molding with two reinforcing rods in same, and these placed in the concrete of base, when that is molded; either method will accomplish the desired results successfully.

This monument may also be molded in a larger size with a total height of 6' 4", weighing about 1,400 lbs. The base is 24" x 24" and 12" high, with a 1" bevel at top of same. The second or center base is 18" x 18" and 6" high, with the same bevel at top of same. The upper base is molded 14" x 14" and 4" in height, with a bevel of $\frac{3}{4}$ " at the top of same. The die or shaft is 12" x 12" and 36" in height to base of cross. The cross is molded 18" in height, with the arms 12" across same and the body of cross 4" wide. The same manner of molding and erecting the cross, as is explained above,

is employed for the larger size. The cross may also be mounted in a square base, without a bevel, by making a square form of the size of the top of the shaft, and then placing the bottom of cross into the center of this form and tamping the concrete around same.

The design of monument shown in Fig. 8 is molded in four sections, and if desired the cap may be made in two sections, thus making five sections to the completed monument. The total height in the smaller size is 52", and the weight is about 2,450 lbs. when molded in marble or granite concrete. The bottom base is 24" by 36" and 12" high, over all, with a bevel at top of $1\frac{1}{2}$ ", making the base $10\frac{1}{2}$ ", at each corner, in height. The second base is 16" x 28" and 10" high, with a bevel of 2", making the outside corners of this base 8" in height; the projection upon each side of base is $1\frac{1}{2}$ " in height, and is made by cutting into the bevel strips, upon each side, to make a mold for the projection, which is 6" in width along the side of this base. The die is 24" wide, 12" thick and 18" high, and is molded square. The cap is 28" wide, 16" thick and 12" in height. This is made up of a bevel of $\frac{1}{2}$ " that is placed upon the die, or the part that makes the bottom of the cap. The next member is a quarter-round of $2\frac{1}{2}$ " and a band of $2\frac{1}{2}$ " above the quarter-round; the bevel above the band is 3" in height, above this a band

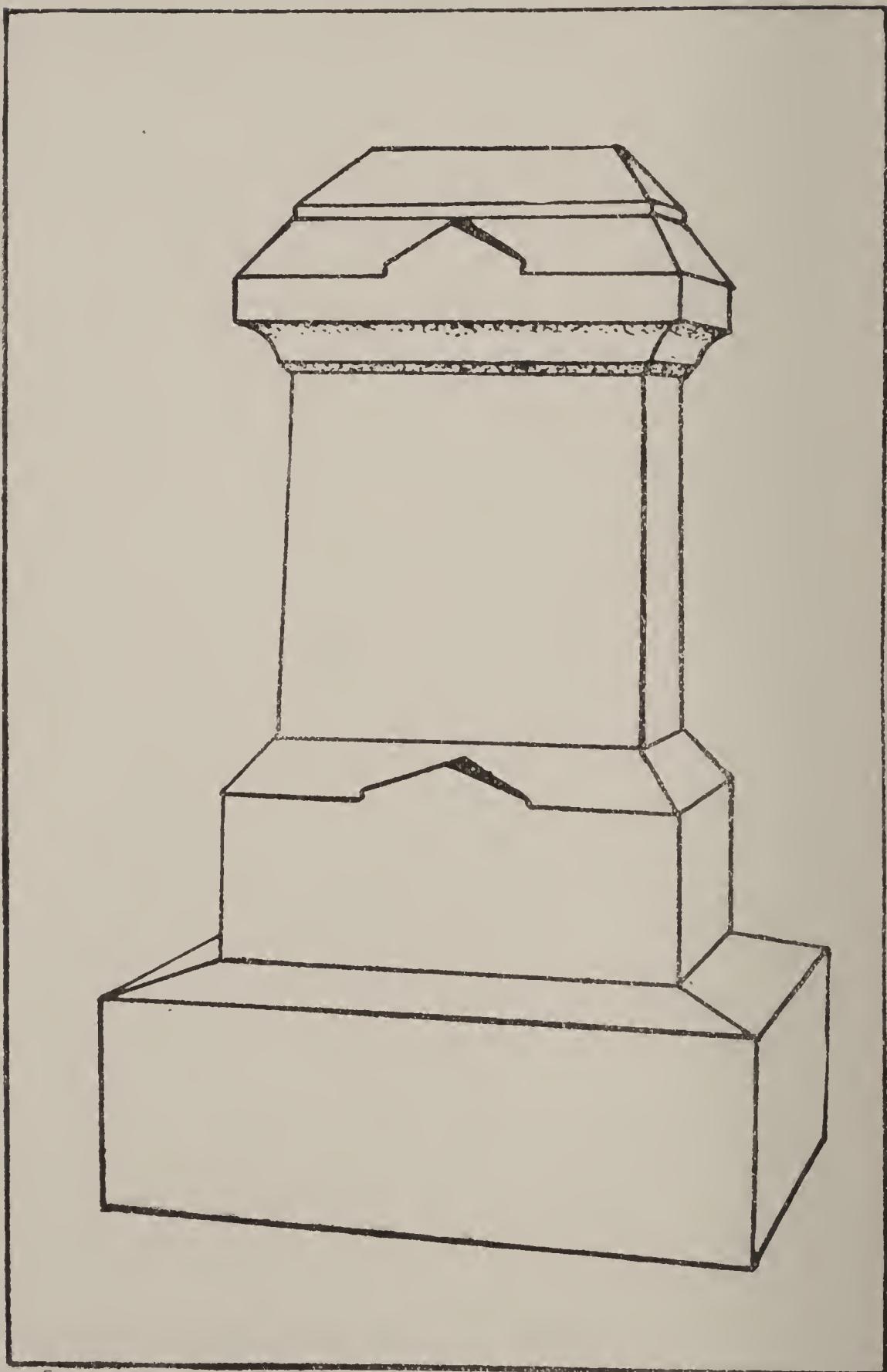


FIG. 8.—Design for a four piece monument.

of $1\frac{1}{2}$ " and a second bevel of 3". The projection on the face of the band is 5" in width and $2\frac{1}{4}$ " in height. This cap may be molded far easier if in two sections, having the second band and bevel to form one section and the balance of cap, below same, to form the second section. The mold for this cap is easily made up of bevel strips and wood mouldings.

The larger size of this design is 62" in height and will weigh about 3,925 lbs. The bottom base is 40" long, 30" wide and 14" in height, with a bevel at top of base of $1\frac{1}{2}$ ". The second base is 20" x 30" and 12" in height, with a bevel at top of same of 2", and the same size of projection upon base as for the smaller size. The die is 24" wide, 14" thick and 22" high, molded in a square form. The cap is 29" wide, 19" thick and 14" in height, made up of a $1\frac{1}{2}$ " bevel at the bottom, a 3" quarter-round above this, a 3" band above the quarter-round, and a $3\frac{1}{2}$ " bevel; a second band of $1\frac{1}{2}$ " and another $3\frac{1}{2}$ " bevel at the top of cap. The projection upon cap is made the same size as explained for the smaller size of monument.

This is a very beautiful design, when molded in marble concrete or crushed granite concrete, with the center die or shaft made up of panels that have been molded smooth and glossy.

The simple design shown in Fig. 11 is easily and simply molded, and when the vein has been closely

imitated, as shown in illustration, the effect is most pleasing.

This may be molded 36" in total height, and to weigh about 1,025 lbs. The base is molded 16" x 30" and 12" in height, with a bevel of $1\frac{1}{2}$ ", making the total height of base at each corner $10\frac{1}{2}$ ". The shaft or die is 24" x 24" and 10" thick, the top is finished with a bevel of $4\frac{1}{2}$ ", making the die or shaft $19\frac{1}{2}$ " in height at each corner. This style easily permits the panel system of molding, as shown in illustration.

The larger size is molded with a base of 20" x 38" and 16" in height, with a bevel at top of same of 2". The shaft or die is 30" x 30" and 12" thick, with a bevel at the top of $6\frac{1}{2}$ ". Thus making the height at corners $23\frac{1}{2}$ "; the total height of the completed monument is 46", and the weight is about 2,100 lbs.

LETTERS FOR CONCRETE MONUMENTS

This part of the work may be simply and easily accomplished, where a plain block letter is wanted. The method of laying out the letters is shown in Fig. 9 and is employed almost entirely by monumental workers.

The four styles of letters shown in Fig. 9 may be easily molded by using small blocks and strips of wood to mold the outline of the letter. This works very nicely for such letters as are placed

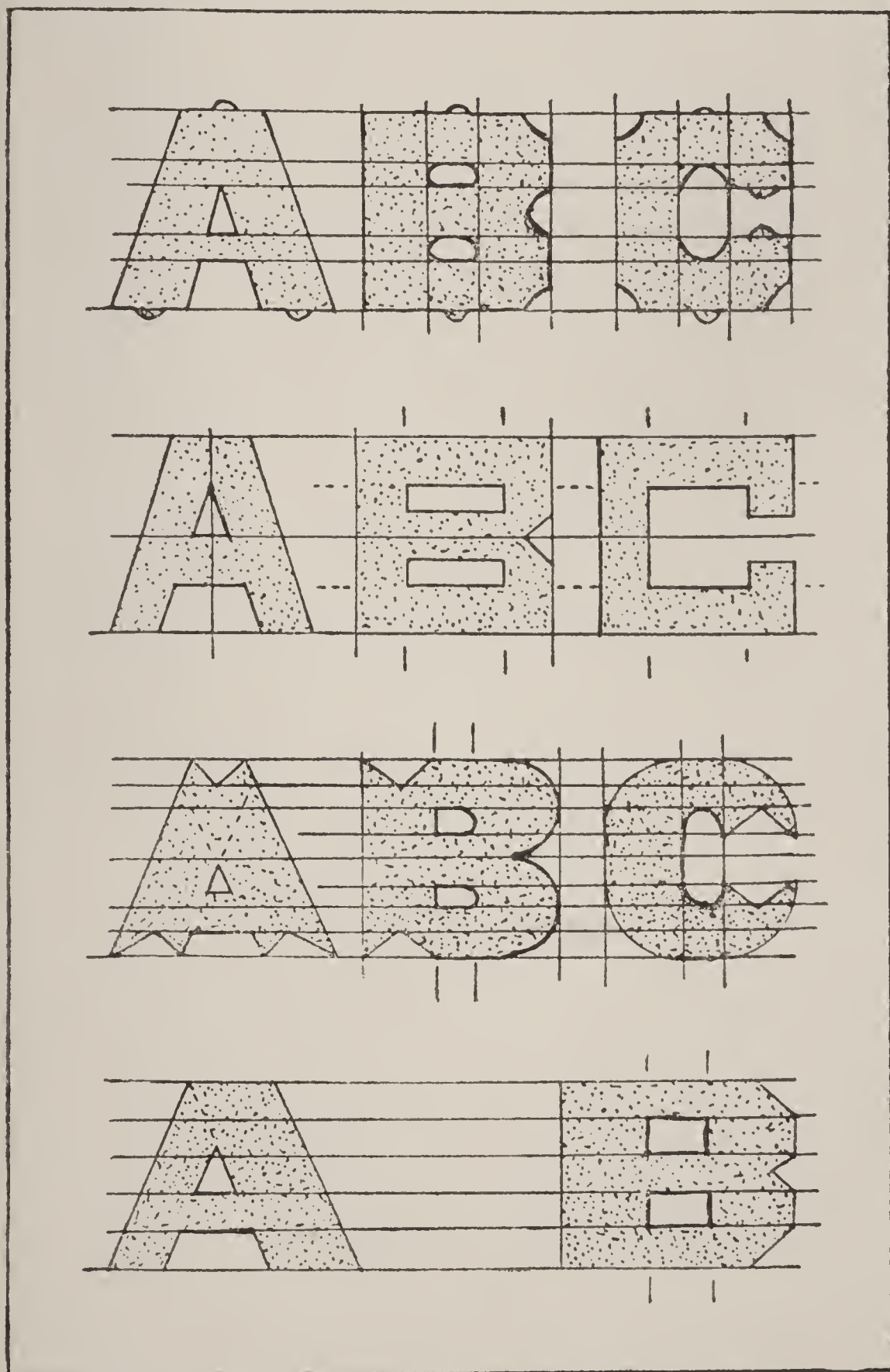


FIG. 9.—Method of drawing the outline of letters.

upon the base, or are large enough to permit this style of molding.

As shown in Fig. 9 the letters may be easily drafted in the exact proportions wanted by drawing guide lines for each portion of the letter, depending upon the style employed.

Where the face of the work is exposed, when the concrete is fresh or "green," the inscription or letters may be imprinted in the concrete by using the metal letters as employed for sidewalks, horse-blocks, etc. The letters are wet each time before imprinting into the concrete, and by employing a ruler to have each letter exactly in line, very neat work may be done. The imperfections in the letters may be remedied when the concrete has hardened by cutting over with a chisel, or by smoothing the surfaces of the letters with a small flat file.

MOLDING CONCRETE LETTERS

Three methods of molding concrete letters are illustrated in Fig. 10. At (a) is shown the arrangement of wood strips to mold the letter indented or imprinted into the concrete; this is arranged upon a plate or strip of wood, so to set into the mold and thus imprint the desired names in the base of monument. The block letters, as shown in Fig. 9, permit any letter to be molded by arranging wood strips in this manner.

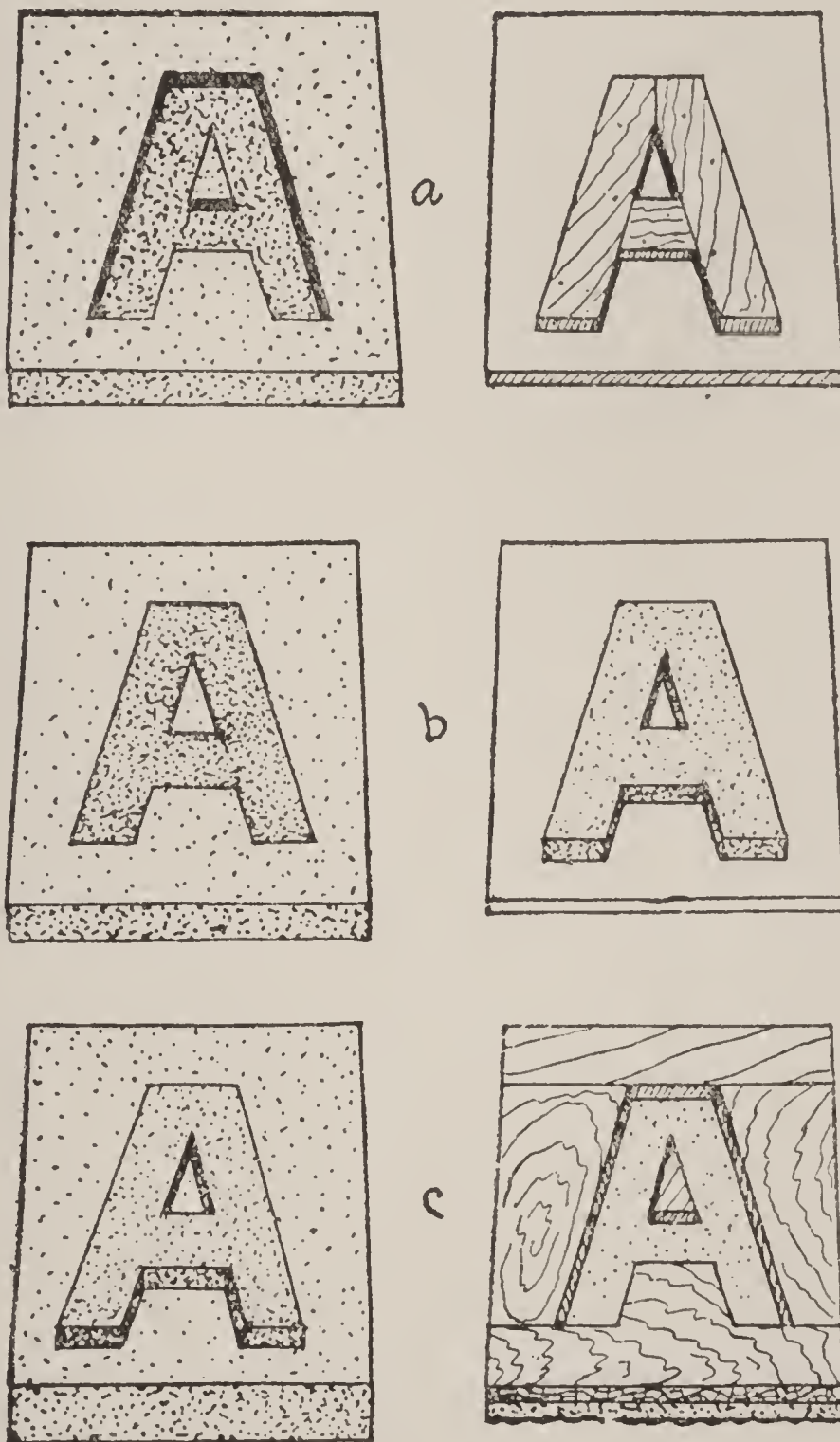


FIG. 10.—Molding indented ; inlaid and projecting letters.

The inlaid letter shown at (b) Fig. 10, is molded by arranging the wood strips so to mold the letter complete, as is shown at (c). The letter is then placed upon a pallet or glass slab and the concrete of a contrasting color placed around same, to make the name plate. This plate is then set into the monument in the manner employed for panels.

The inlaid letter, molded in contrasting colors of concrete, is a very durable and popular letter, as there is no sharp edges to break off, and if the concrete is colored by using various colors of aggregate, the letters will always be clear and easily read, even from a distance. This feature is of value to every purchaser of a monument, as they always desire those grades of stone in which the inscriptions will show the most contrast; hence this style of lettering will be most popular.

The projecting letters shown at (c) are molded with the same form as employed for the inlaid letter; the operation is different from the fact that the base is molded complete, and then the molds for letters are placed at the proper point upon the base and the concrete for letters placed. This molds the letters projecting from the face of the base, equal to the thickness of the molds for the letters. The bond between letters and base is increased by exposing the aggregate at that point, either with acid or by drawing the outline of letter upon the base and then cutting the surface

with a chisel, to make a rough surface to which the new concrete for letters can bond.

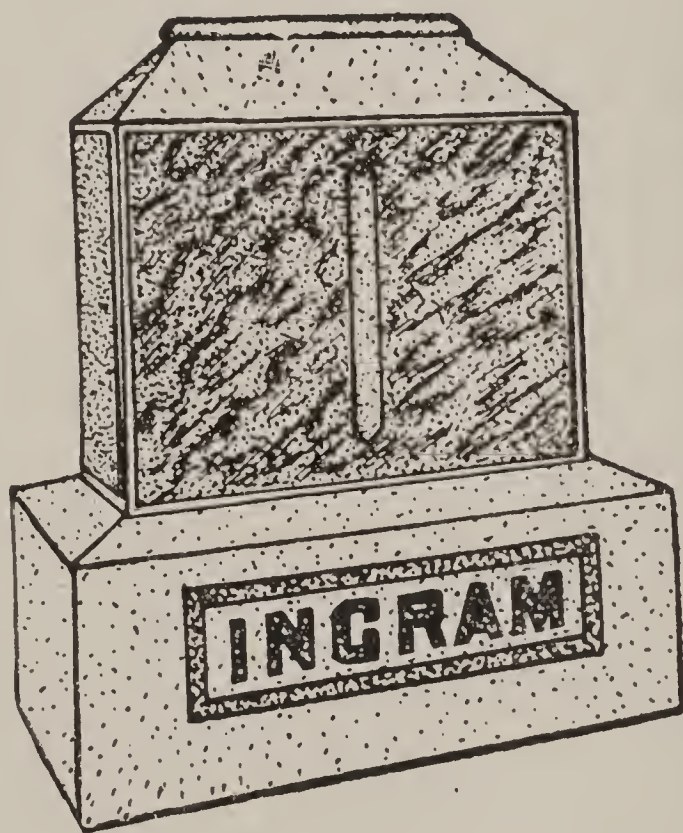
CUTTING INSCRIPTIONS UPON CONCRETE

The inscription may be engraved upon the concrete work by any careful workman as easily as upon marble or granite. The requisite is that the panel or portion of the monument upon which the inscription is to be cut must be of a fine aggregate; this prevents chipping or the concrete breaking except along the lines desired. The concrete works the best when it is at least one month old, and at no time after that is it impossible to carve or cut the letters successfully. The work is very easy when the concrete is about 5 or 6 days old, if care is employed to prevent the concrete breaking outside of the line of the letters.

MOLDING AND PLACING NAME PLATES

Either inlaid or projecting letters are very attractive when set into a name plate, as shown in Fig. 11. The letters are molded as illustrated in Fig. 10, and then placed upon a slab, and by employing another color for the concrete, surrounding the letters, they are brought out very prominent. When a border is molded for the name plate, as illustrated, the effect is far better.

The method of placing the name plate in the concrete is shown at (a) Fig. 11. A sheet of ex-



a

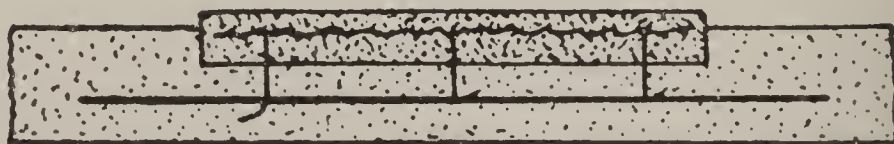


FIG. 11.—Name plate set into monument and method of placing same.

panded metal lath or wire lath is molded in the center of the name plate, with projecting wires from same which are anchored to a rod or bar molded into the base, thus insuring that the inlaid plate cannot be removed. The plate may be molded flush with the surface of base or to project $\frac{1}{4}$ inch or more as may be desired.

IMITATING THE VEIN OF NATURAL STONE

The effect of imitating the vein of the natural marble is also shown in Fig. 11. This is done by using a thread saturated in any permanent dye, or making the outlines of vein with a brush filled with the dye. The color is absorbed into the concrete and makes a pleasing effect.

This method is fully explained in **MOLDING AND CURING ORNAMENTAL CONCRETE** of this series, as well as more complete instructions for molding marble concrete and granite concrete; also instructions on treating molds to prevent sticking, curing the casts, etc.

TREATING THE MOLDS TO PREVENT STICKING

Wood molds demand a coating of oil to prevent the wood from absorbing moisture from the concrete, which causes the concrete to adhere to the surface of the mold, and also causes the wood to warp and check, thus spoiling the mold.

The best treatment to prevent this is equal parts of linseed oil and petroleum; this is applied with a brush and the surface given two or three coats, so that the wood will absorb all the oil possible. This oil coating is also applied before each cast is made, using a light coating.

PREPARING THE CONCRETE MIXTURE FOR MONUMENTS

If an ordinary 1:2:4 mixture is employed the concrete must be spaded next to the forms, so to press the larger particles of aggregate away from the surface. The best mixture to employ is a sand for the aggregate, running from coarse to fine particles, and a mix of 1:3 for the facing coat.

On bases and large shafts or dies the facing coat may be placed around the outside of the mold by using a box form, or core form, of sheet iron about 2 inches smaller on all sides than the inside of mold. The facing mixture is poured between this core and the molding surface, and the mixture for the body of the work is then poured or tamped in the space inside of sheet iron core, raising the sheet iron form as this is placed, so the two mixes of concrete are well bonded together. This permits a rich facing coat, with the body of work made up of a 1:2:4 mixture.

It is also possible to mold a core or hollow inside of the base of monument. Then when it is set up,

this space is filled with concrete, and if the upper and lower bases have this hollow they are strongly held together.

A mixture of marble flour or dust and white sand, in the proportion of one part marble to two of white sand, makes an excellent aggregate for marble concrete; this is mixed with white Portland cement in a 1:3 mixture.

The usual mixture employed for granite concrete is a mix of 1:3 or 1:3½, using crushed granite and white Portland cement for light gray granite concrete, and ordinary Portland with the addition of a little black mortar color for dark gray granite. Either mixture makes a facing coat of exceptional richness of appearance.

SETTING THE WORK IN PLACE

In placing a concrete monument the same care as required for natural stone applies as well to this work. The bar used in lifting the work must never be placed in direct contact with the concrete, always use a piece of wood between the iron bar and the monument.

Also care must be employed not to place the lifting bar too close to the edge of the work, as the weight of the main body coming upon the small section engaged by the bar, is almost positive to break or chip out a small section from the edge.

The heavy sections of a monument may be set

up by using a cement of 1:2, using Portland cement and sand; the surfaces that join are cleaned from the film of cement covering same and this mixture spread upon base; then when the upper section is lowered upon this cement mortar, it can be leveled by inserting a piece of metal under the lowest corner, to hold up same until the mortar has set, when the metal may be removed and the hole left by same plugged.

Where the cap is joined to the shaft and a perfect joint is demanded, the surfaces must be cleaned and a thin coat of neat cement placed upon the top of shaft; upon this the cap is lowered and the cement pressed out by the weight of cap is then carefully wiped away, leaving a joint that is hard to detect when the concrete has hardened completely.

CONSTRUCTING CONCRETE MAUSOLEUMS

At Fig. 12 is shown the ground plan for a small size concrete mausoleum, this may be erected for any number of crypts. The walls for the outside may be erected 8" thick, and of either monolithic or hollow building blocks as desired.

The crypt partition walls are built 4" thick, and in the center of same expanded metal lath is placed as a reinforcement. The walls should be planned so to give a space for each crypt of 3' in width and 8' in length, to which is added the 6" ledge for

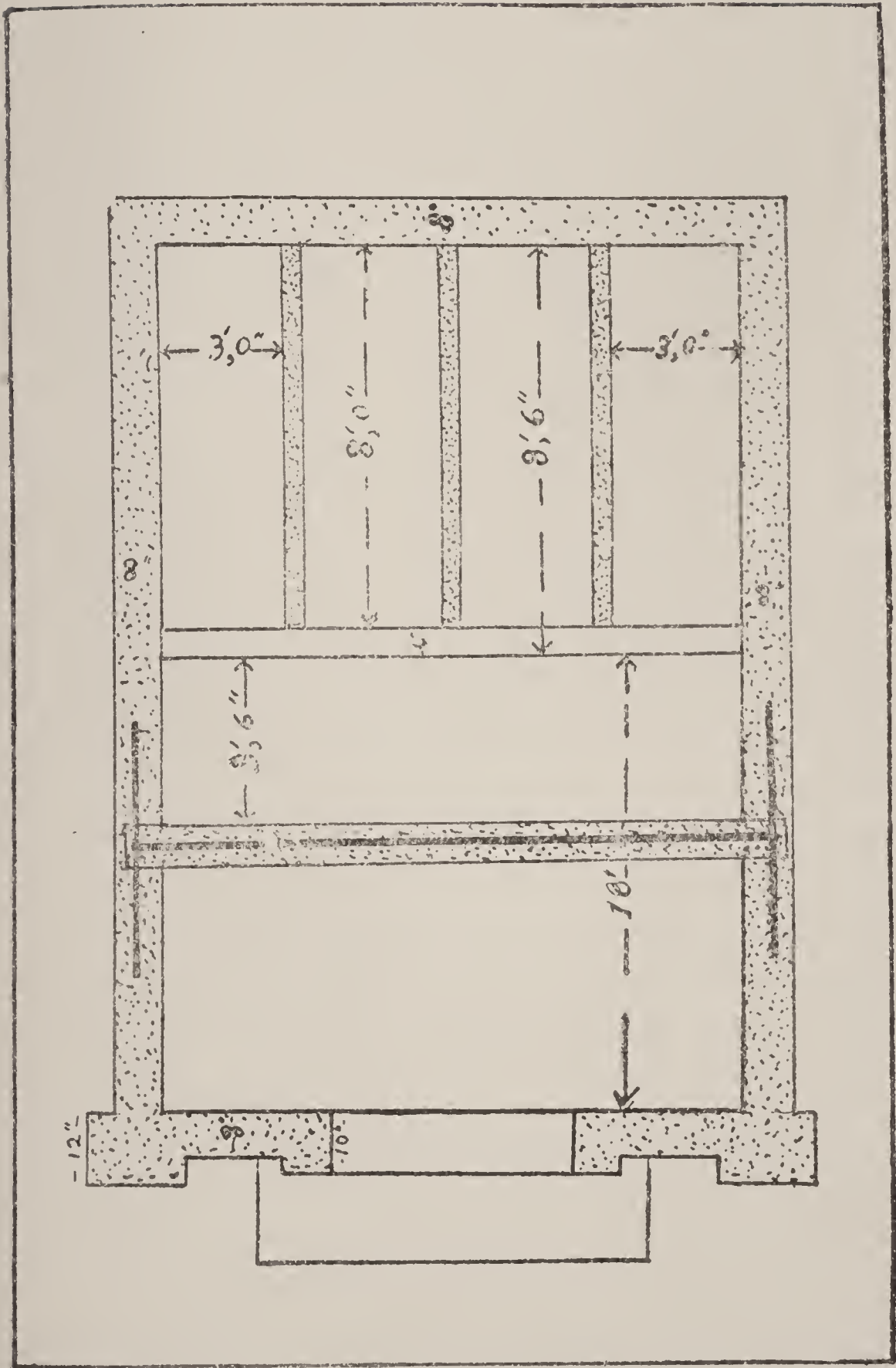


FIG. 12.—Ground plan of mausoleum.

the horizontal shelves or partition walls. This ledge projects outward 6" from the end of the vertical partition walls, and thus makes a shelf to support the door or slab to close the crypt opening.

The space from ledge to the front of mausoleum is usually 10', so to give ample room for inserting the casket and attaching the tackle to raise it to the crypt shelf, it is to occupy.

The tackle is attached to a re-inforced concrete beam, which is securely anchored to the side walls, and is spaced 3' 6" from the edge of the 6" ledge, on crypt partitions.

The foundations for the work must be at least 3' in depth and for a mausoleum the size shown in plan, the footing must be 12" wide and 8" in depth. The floor is laid upon a fill of gravel that is 5" to 7" in depth, with the floor 4" in thickness, of 1:2:4 concrete finished with a top coating of 1: 2-1/2 facing mixture.

A concrete roof is made of slabs molded 3" thick and amply re-inforced with expanded metal lath; the central walls for the crypt partitions should extend to the roof, so to form a support for same, as well as a post or strut erected from the tackle beam to the ridge of roof. The many styles of concrete roofs shown and described in the No. 4 book of this series, MOLDING CONCRETE CHIMNEYS, SLATE AND ROOF TILES, will also be

of invaluable use for this work, permitting a lighter roof and one more ornamental. It must be considered that the usual mausoleum of this size is built into a side-hill, and that the roof is covered with earth; this loading must be estimated in planning the re-inforcing for the roof of the mausoleum.

The ceiling is placed even with the lower edge of the tackle beam, and may be plastered upon expanded metal lath, so to give a smooth perfect finish to the ceiling.

The details of the crypt partition walls and shelves are clearly shown in Fig. 13. The re-inforcing material or expanded metal lath is placed in the center of the wall, which for both shelf and partition wall is made 4" thick.

The height of each crypt is 2' 6", as illustrated, and the width is 3' 0". The mold for the crypt is easily made in a square box form, and this placed at the proper point upon the concrete for the shelf below same, and thus molds the partition walls and also the shelf above the crypt. This form must be made in sections, so it can be easily removed from the work; this is not done until the concrete has hardened sufficiently to hold up its own weight, and that of the concrete above same.

One design of tackle beam is shown at (a) Fig. 14, this is 8" x 12", and inside same are placed two channel irons, bolted together to leave a space of

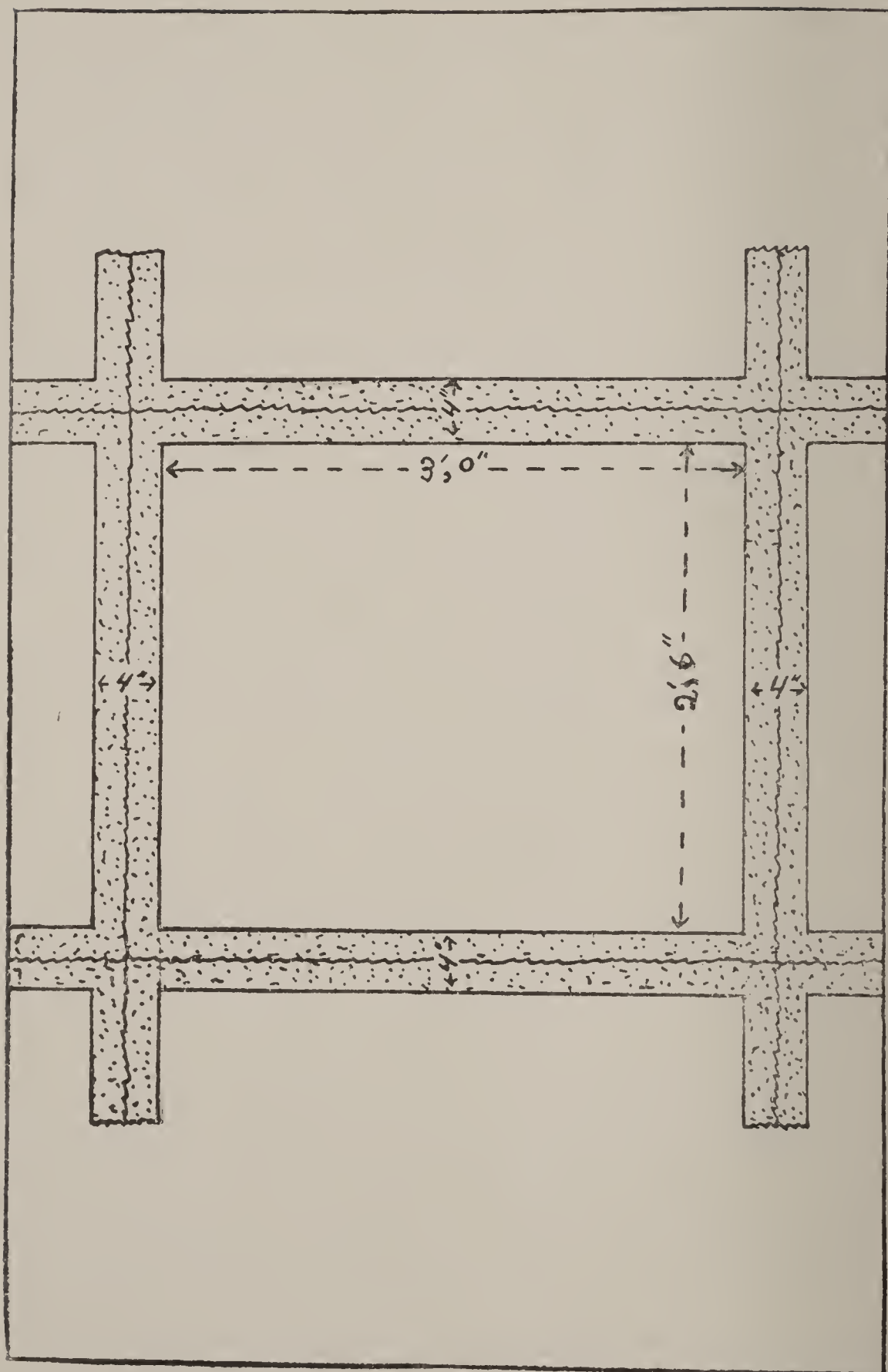


FIG. 13.—Detail of crypt shelves and walls.

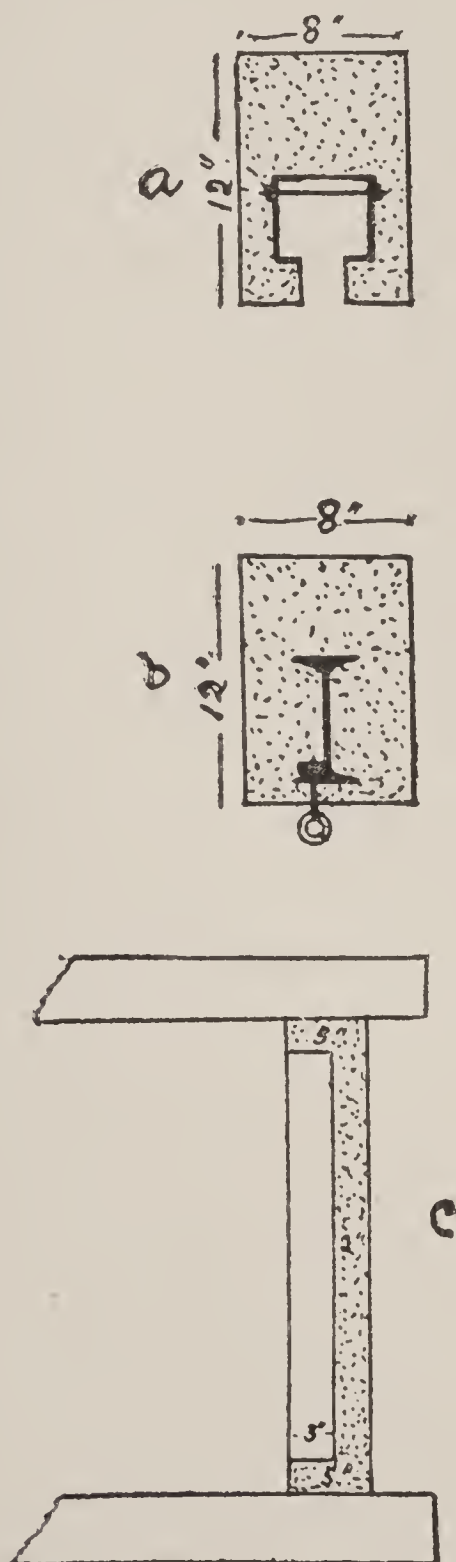


FIG. 14.—Details of door and tackle beams.

one inch at the bottom; the top being filled with a bar of strap iron or steel of the right width. This permits the tackle to be attached to a pulley or wheel running inside this channel iron, and is thus moved from one side of the mausoleum to the other, so to have it always ready for the crypt opening into which the casket is to be placed.

Another type of tackle beam is shown at (b); this is of the same size, but with a I-beam imbedded in same, to which are attached bolts with an eyelet to which the tackle is fastened. These eye-bolts must be placed directly in front of each tier of crypt openings.

The details of door are shown at (a) Fig. 14, the door is molded 5" in thickness upon the edges, of which 3" is a projection extending entirely around the edge, with the main portion of door or slab 2" in thickness. This gives a more secure sealing of the crypt, and by re-inforcing the door or slab, the 2" thickness is ample. The door rests upon the 6" ledge at top and bottom of each crypt opening, thus preventing the weight of door from being placed upon the portion projecting inside the crypt.

DESIGNS FOR FRONT ELEVATION OF MAUSOLEUM

At Fig. 15, and also at Fig. 16, are shown two excellent designs for the front elevation of a small mausoleum. These units are easily molded in any

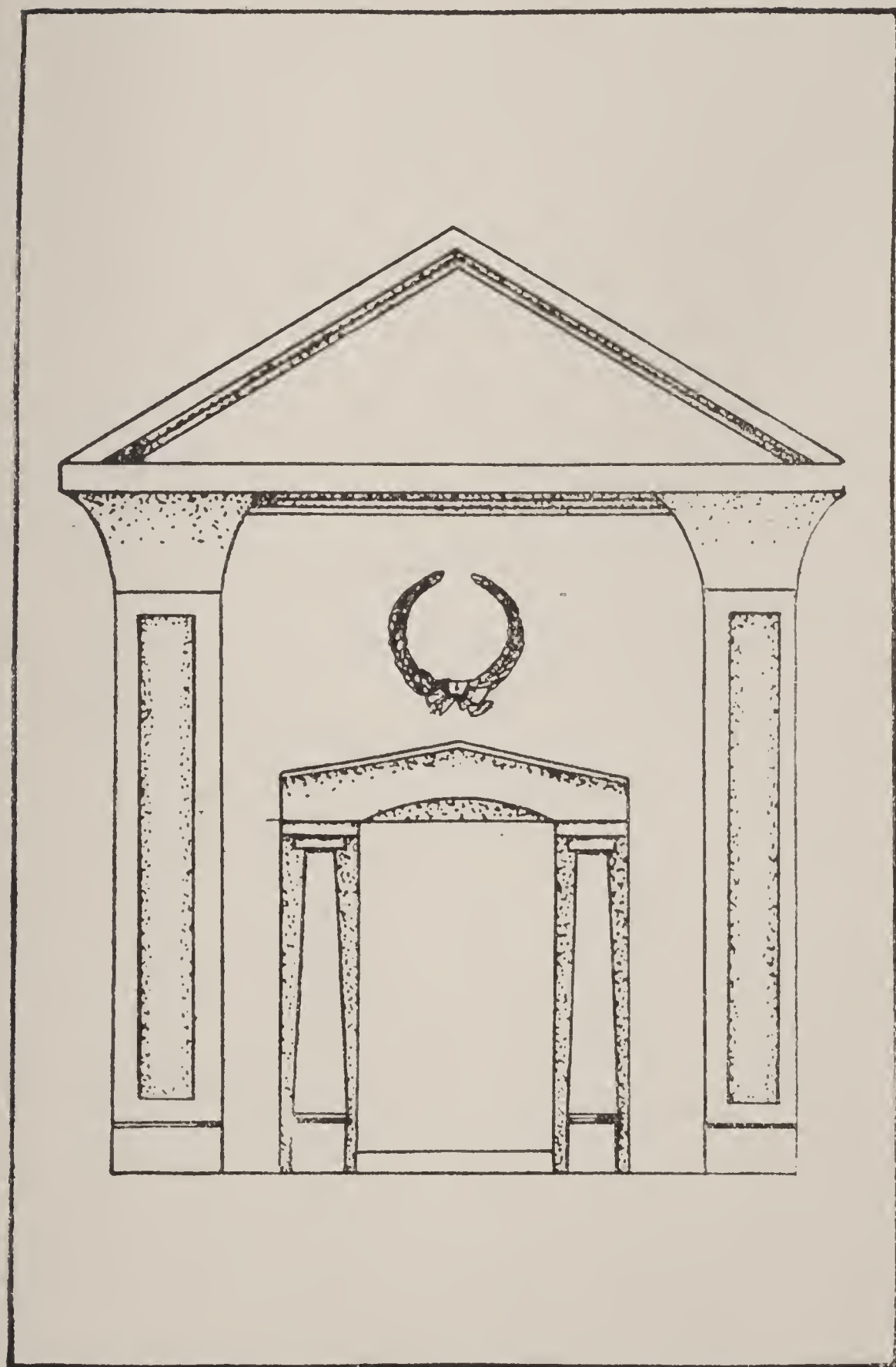


FIG. 15.—Design for front elevation of mausoleum.

concrete yard, and then erected with the main walls of the structure.

The piers at each front corner should be at least 12" on the face, for an 8" thickness to the main wall.

The design at Fig. 16 is specially attractive as it provides for the entrance to be placed at nearly 3' back from the front edge of piers. The panels shown in piers are simply molded by placing a projecting strip inside the mold for pier; this should not be the entire width of the panel, but by surrounding with a moulding, the edge or panel is neatly ornamented.

The wreath shown in both designs is produced in a plaster mold, upon a body or block for inserting into the wall of the mausoleum, as it is placed. A good design is also secured from the stamped sheet steel ceiling plates, used as the face plate of mold to cast the wreath.

The columns are produced by any of the molds for this purpose and are employed in the front elevation designs, as illustrated.

MOLDING A CONCRETE COLUMBARIUM

At Fig. 17 is shown an excellent design for a concrete columbarium, or a chamber for holding the urns containing the ashes of the cremated dead. This may also be employed for a small private mausoleum, as the design is easily changed

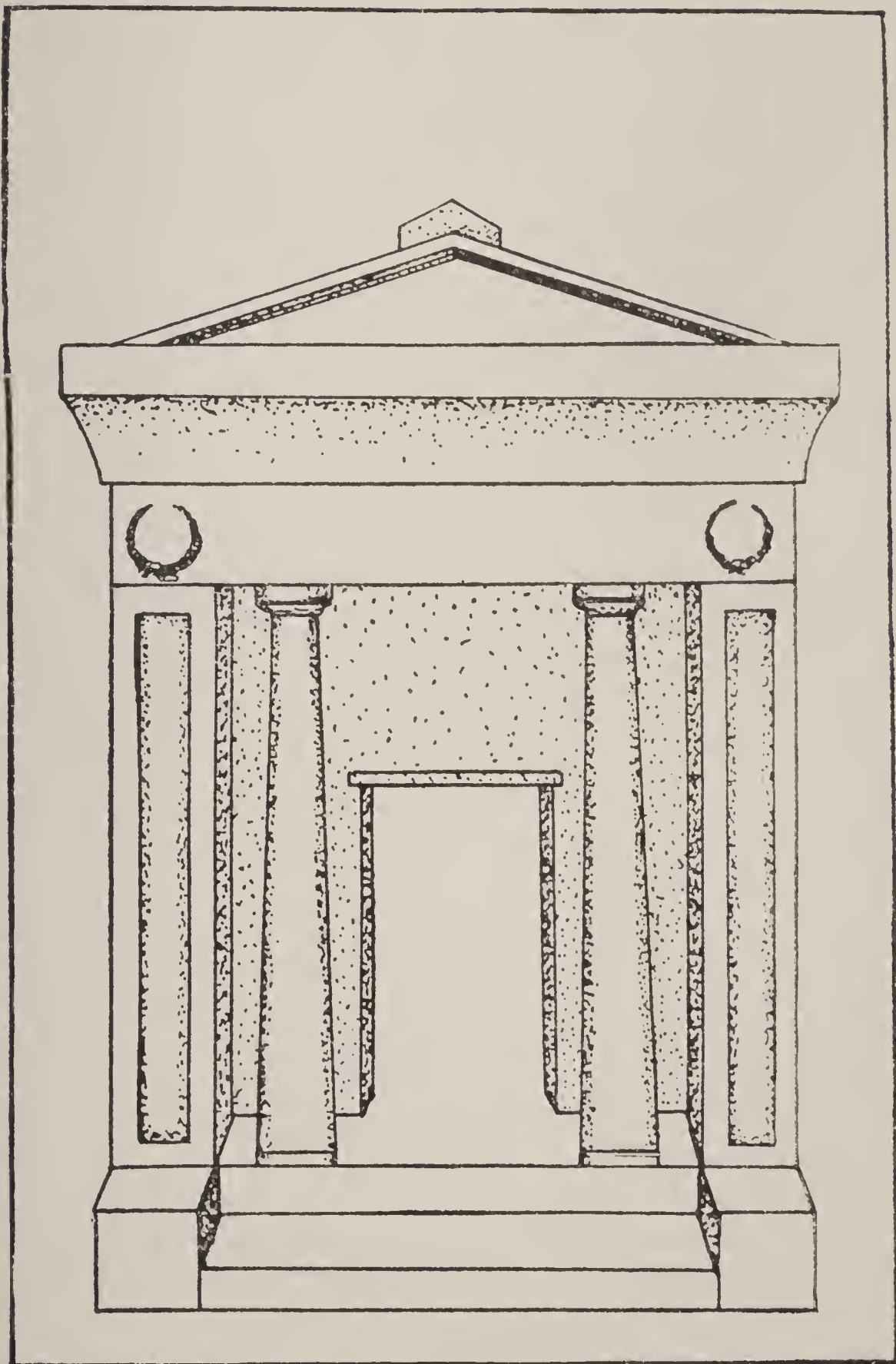


FIG. 16.—Design for front elevation of mausoleum.

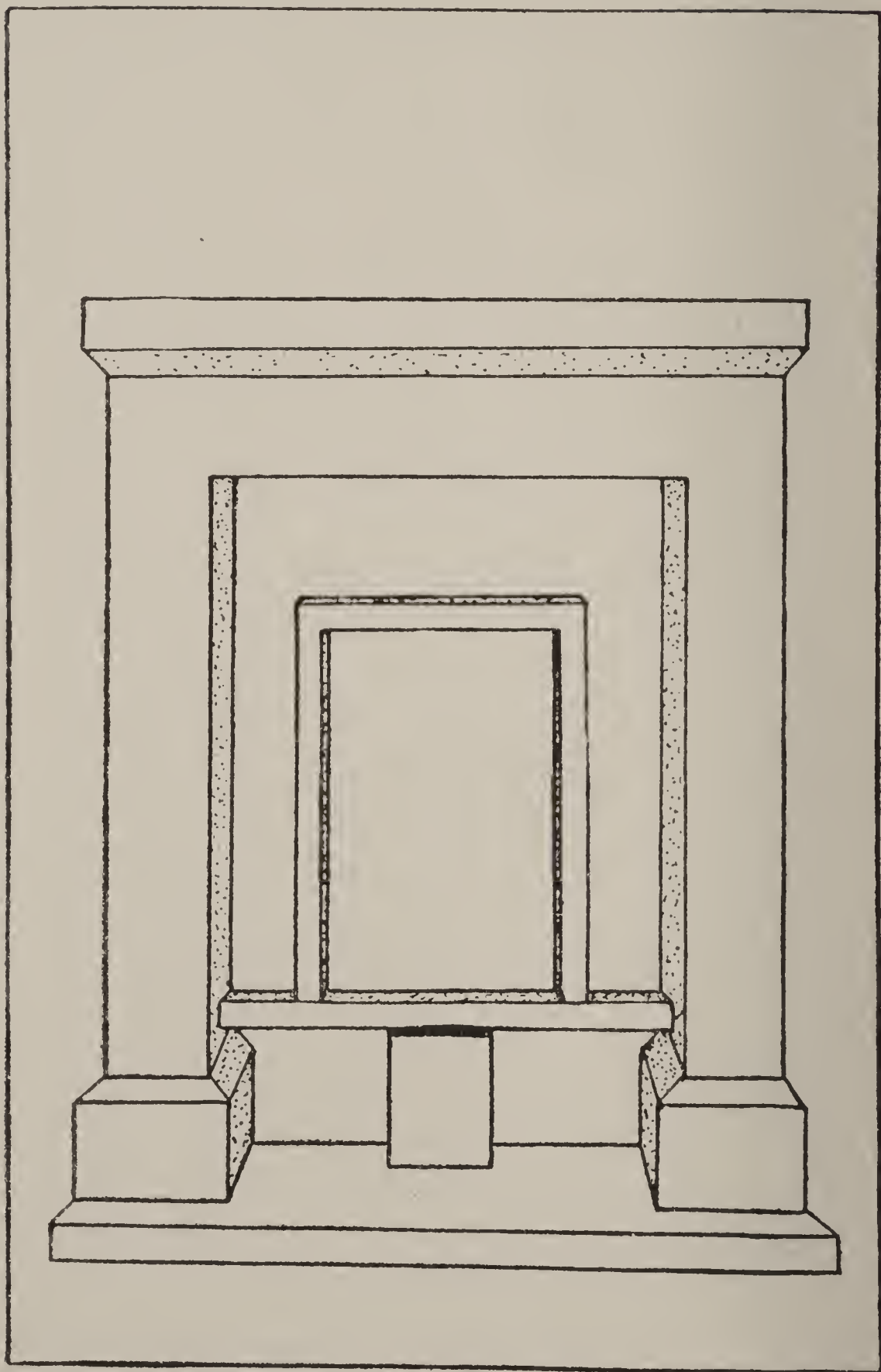


FIG. 17.—Front elevation for concrete columbarium.

to be adaptable to a large or small size of structure. While the method of building the crypt or niche is practically the same as explained for the concrete mausoleum, the design is without an entrance or corridor thus enabling it to be erected as a private mausoleum upon the space provided by an ordinary cemetery lot.

The door is shown by the panel in the front of the design at Fig. 17, this is constructed with a projection on the inside edge, so to seal the chamber securely, when door is in position. The door rests upon a ledge below same, so the weight of door is not upon the inside projection, and as it also projects upon each side of opening it can be drawn tightly with ornamental bolts, placed in expansion shields or anchors imbedded in the concrete at side of opening.

MOLDING CONCRETE BURIAL VAULTS

Concrete burial vaults are constructed on two different systems, those most satisfactory are molded of re-inforced concrete, thus making the walls far lighter and permitting a thickness of wall of 1" to 1½", and making the vault weight but 1,000 lbs., when complete.

The solid wall type is usually made from 2" to 3" in wall thickness, and are very heavy, as well as being more easily damaged when they are shipped.

The molds shown in Fig. 18, permit either type of vault to be successfully molded. The core is built of the exact size that is desired for the inside of the burial vault, this is held together in six sections, by brackets and pieces of strap iron fastened to the wood of vault core with screw-eyes. Thus, when the concrete has hardened the brackets and strap-irons may be removed, and the core drawn in sections from the work. A strip of wood is fastened to the molding board, as shown in illustration, this just fits inside the core form; thus insuring that the core will be held rigidly in position, when placing the concrete.

The outside forms are built of wood covered with sheet metal. When the stamped sheet metal is employed, the outside of the vault is ornamented with attractive bas-relief designs upon the surface. The outside centering is built to mold the thickness of wall desired, which is shown in Fig. 18, with the expanded sheet metal re-inforcement imbedded in the center of the walls.

This type of molds brings the trowel finish upon the bottom of mold, and also insures more perfect work, as the concrete is always within the sight of the operator, when the work is poured; which is not so when the vault is molded in any other manner.

It is always best to have two or three sizes of vaults, instead of using adjustable molds, as the

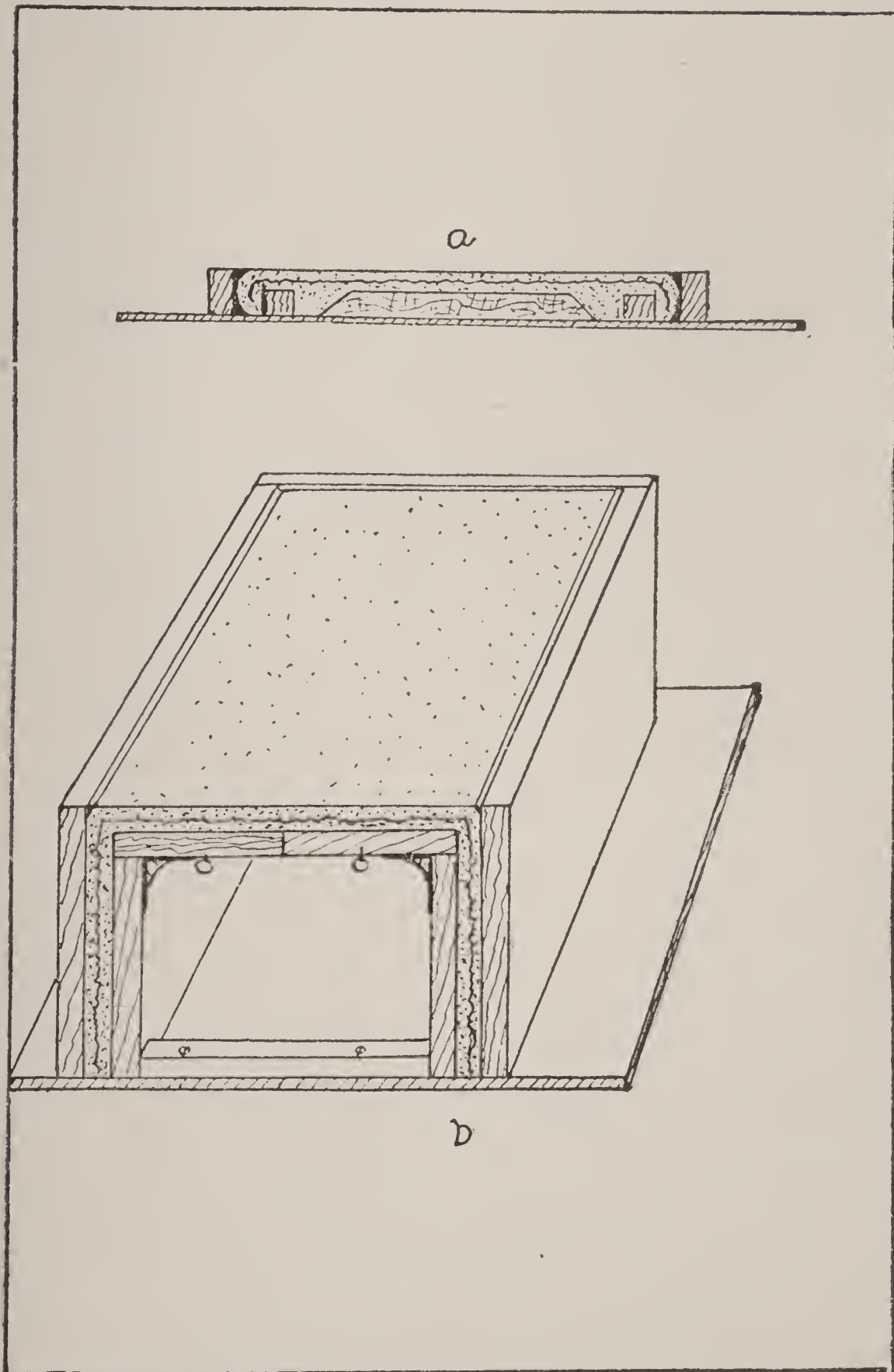


FIG. 18.—Details of molding concrete burial vaults.

low cost of molds makes the expense a small item, while an adjustable mold causes more or less annoyance by being pressed out of position by the weight of the concrete poured into same.

A cross section of the lid or cover is shown at (a) Fig. 18, this is molded upon a pallet or molding board, and upon this strips are nailed to mold the entire thickness of cover and also to mold the channel or groove in same, that fits down over the edge of the body of vault or box. This channel must be the same width as the edge of the box, so that it will fit perfectly, and thus seal the vault when in place.

The lid and also the top edge of box may be molded with serrated edges, so that they will lock together in the manner of a vault door, thus making a joint that is tight and does not require but little mortar to make a perfect air and water-tight joint. The lid of vault should be re-inforced with expanded metal, as shown in illustration, so that it will be amply strong for the purpose.

The water-proofing of a burial vault must be done with care and thoroughness, so that it will resist the water pressure to which it will be subjected; this is the most successfully done by adding a water-proofing compound to the cement, or the use of any compound that will fill the pores not only upon the surface, but for the entire thickness of wall as well.

The sale of vaults is benefited by employing a white or marble like finish for the outside and inside surfaces, this is accomplished with some water-proofing compounds or finishes. This manner of treating the vaults gives them a far better appearance, and one that is positive to be more popular with the buying public. The concrete employed in molding burial vaults, when re-inforced, should be a 1: 3 mixture, using well-graded sand; this must be poured wet so that it will bond the more strongly to the metal, used for re-inforcement.

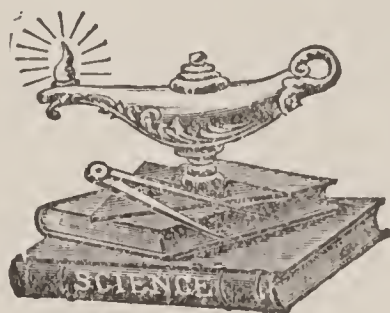
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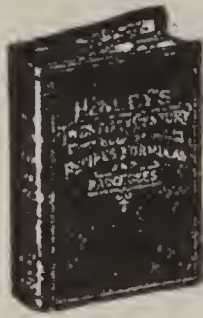
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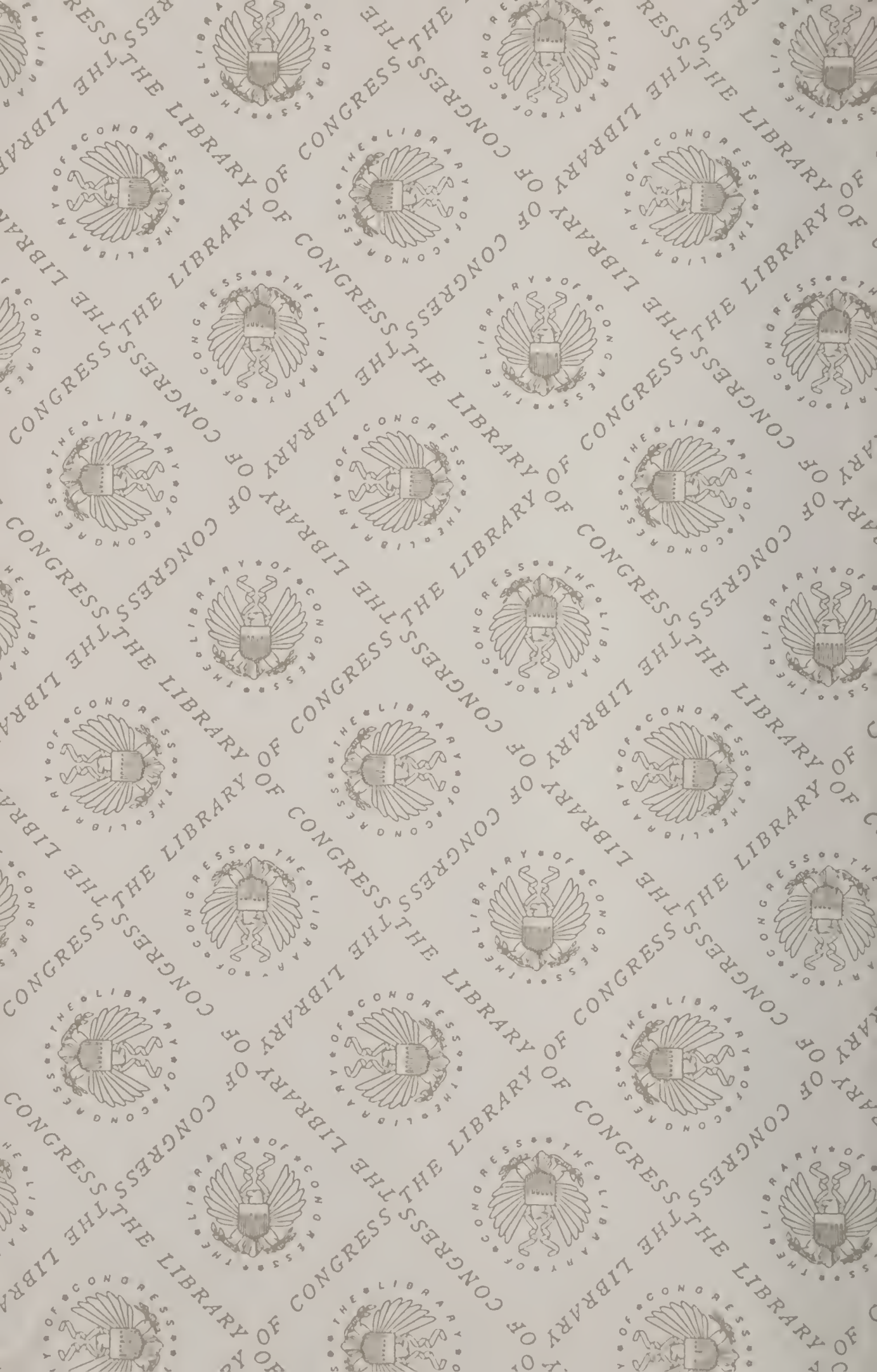
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